

Senior Capstone Design

Project: Hypoxia Chamber

Team: HYPEngineers

Primary Author:

Date: 10/21/2020

Design Validation Plan & Results (DVP&R)

Test Owner	Requirement	Test	Test Subject	Target Date	Result	Recommendation
	Chamber should maintain a hypoxic environment for a period of at least 21 days	Run control system to pump the correct % of gas in to create hypoxic environment	Fully functional prototype	1/30/21		
Colin	Chamber should be airtight	Slightly pressurize chamber and use soapy water to check for bubbles on all edges	Chamber prototype	12/3/20		
Colin	Maximum weight shall not exceed 20 lbs	Virtually weigh it within CAD software. Weigh the full system on the scale in GJ 126	Virtual Testing and Chamber Prototype	12/3/20		
Jacob	Maintain 5% CO2 levels	Use the CO2 sensor for daily measurements for 5 days	Fully functional prototype	12/17/20		
Alex	Maintain 1 to 21% O2 levels	Use the O2 sensor to test various O2 levels for a period of 5 days each	Fully functional prototype	12/17/20		
Alex	Reach proper setpoint Hypoxic and CO2 levels within 15 minutes	Create a setpoint on the GUI and check if it reaches that level within 15 minutes. Then open the door	Fully functional prototype	1/14/21		
Isabell	The chamber should be structurally stable	Apply various forces to chamber and observe any structural changes	Chamber prototype	12/3/20		
Jacob	Product must be durable to potential autoclaving or sterilization procedures	Review the properties of all of the components used	Virtual Prototype	12/3/20		
Isabell	The inside of the chamber must at least fit 4 13cm x 9cm x 2.5cm well	Model the plates and attempt to place plates inside the chamber	Virtual Prototype	12/3/20		
Jacob	Sensors are able to read accurate data to the arduino	Connect the O2 and CO2 sensors to the arduino and try and get sensors values.	Control System prototype	11/26/20		
Andrew	Arduino communicates sensor data to the raspberry pi interface	Connect the arduino and raspberry pi together over serial communication	Control System prototype	12/3/20		
Alex	Arduino control over solenoid gas valve	Purchase a solenoid valve and connect to the arduino to ensure control works	Control System prototype	11/26/20		
Andrew						

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Andrew	Disable functionality whenever the door is opened.	Create a switch on the gui to alert when the door is open and disable input of gas	Control System prototype	1/30/21		
Isabell	Achieve 95% humidity within the chamber	Place a well of water or saturated sponge in the chamber and measure humidity over a day	Fully functional prototype	1/30/21		